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Material Test Procedure 8-2-011
Deseret Test Center

U. S. ARMY TEST AND EVALUATION COMMAND
COMMODITY ENGINEERING TEST PROCEDURE

FILLING APPARATUSES, CHEMICAL LAND MINE

1. OBJECTIVE

The objective of this commodity engineering Material Test Procedure (MTP) is to establish uniform procedures for determining and evaluating the technical performance of chemical land mine filling apparatuses in terms of the criteria established by the applicable Qualitative Material Requirement (QMR), Small Development Requirement (SDR), Technical Characteristics (TC), and other design requirements and specifications. These procedures will also permit evaluation of the relative safety of test items in the hands of Army troops and the suitability of items for service testing.

2. BACKGROUND

The chemical land mine filling apparatus is used for field filling of individual land mines from drums or large storage containers containing chemical agents. The apparatus should be capable of measuring and dispensing the correct quantity of chemical agent to the land mine with no spillage or contamination.

3. REQUIRED EQUIPMENT

- a. Decontamination Equipment
- b. Environmental Chambers for:
 - 1) Low and High temperature testing
 - 2) Fungus testing
 - 3) Humidity testing
 - 4) Dust testing
 - 5) Sunshine testing
 - 6) Water immersion testing
 - 7) Salt fog testing
 - 8) Rain testing
- c. Materials Handling and Transportation Equipment
- d. Suitable Site for Testing
- e. Photographic Equipment for:
 - 1) Still
 - 2) Motion
- f. Meteorological Equipment to measure and record:
 - 1) Temperature
 - 2) Wind direction and speed
 - 3) Relative humidity
- g. Protective Clothing

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- h. Aircraft or Simulated Aircraft
- i. Accelerometers, as required for:
 - 1) Vibration
 - 2) Shock
- j. Airdrop Testing Facilities

4. REFERENCES

- A. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
- B. USAMC Pamphlet 706-134, Engineering Design Handbook: Maintainability Guide for Design.
- C. MIL-STD-810B, Environmental Test Methods.
- D. MIL-STD-1472, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities.
- E. MIL-H-46855, Human Engineering Requirements for Military Systems, Equipment, and Facilities.
- F. MTP 7-1-002, Airportability and Airdrop Service Testing.
- G. MTP 7-2-509, Airdrop Capability of Materiel (General).
- H. MTP 8-2-500, Receipt Inspection.
- I. MTP 8-2-503, Rough Handling and Surface Transport.
- J. MTP 8-2-510, Decontamination.
- K. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers.

5. SCOPE

5.1 SUMMARY

The following subtests comprise the complete procedure:

- a. Receipt Inspection - An inspection of the test item as received to (1) determine its physical characteristics and conditions, (2) locate defects, and (3) identify damage received during transport. During this inspection the test items will be serially numbered for subsequent identification.
- b. Safety Evaluation - The objective of this procedure is to check the Safety Statement issued by the developing agency and to identify the safety hazards, if any, which must be included in the Safety Release Recommendation required by reference 4A (USATECOM Regulation 385-6).
- c. Simulated Environmental Testing - A study to determine the effects of extreme temperatures, fungus, humidity, dust, sunshine, and fresh and salt water on the test item.
- d. Rough Handling and Surface Transport - A study to determine the effects of rough handling and surface transport on the physical and operational characteristics of the test item.
- e. Air Transportability - A study to determine the ease of loading and unloading the test item on and from aircraft.
- f. Airdrop Capability - A study to determine the effects on the test item resulting from its being subjected to airdrop conditions.
- g. Leak Testing - A study to determine if the test item leaks when

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subjected to standard leak tests and conditions.

h. Operational Reliability - A study to determine if the test item meets specified reliability criteria.

i. Decontamination Aspects - A study to evaluate the ease with which the test item can be decontaminated and the effects of the process on the test item.

j. Maintenance Characteristics - A study to determine the ease of performing the required maintenance on the test item, and the need for special tools and skills.

k. Human Factors Aspects - A study to assess the ease of handling and operating the test item.

l. Agent-Hardware Compatibility - A study to determine if the chemical agent dispensed by the filling apparatus damages the apparatus.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Prescheduling Conditions

a. Decontamination equipment must be available at a suitable test site.

b. Meteorological forecast must be available before the conduct of each outdoor subtest to prevent wasted effort in unsuitable weather.

6.1.2 Safety Statement

The test officer will ensure that a Safety Statement is received from the developing agency before commencing testing and that it is understood by all test personnel. The Safety Statement includes information pertaining to the test item's operational limitations and specifies hazards peculiar to the item or components which are to be tested.

6.1.3 Safety Procedures

a. Test plans and procedures will ensure performance in the safest manner consistent with accomplishing the mission. Plans will include safety procedures, precautions, protections, and emergency procedures as necessary. Technical information on the hazards and safety characteristics of the test item, as provided by the Safety Statement, and other pertinent information will be included. Such information will include an evaluation of potential hazards, analysis of risks, limitations, and precautions, including special test equipment and techniques that should be incorporated in test plans and procedures.

b. One individual will be charged with responsibility for safety. He will be familiar with the construction and operation of the test item and its critical components, will have full knowledge of the hazards and safety aspects of the test, will review test procedures for evaluation of hazards, and

will recommend control measures.

c. All personnel who participate in or observe the tests will be briefed on the proper test methods and procedures.

d. Because some chemical agents are potentially dangerous, all test personnel must constantly consider not only the hazards that may be encountered during normal conditions, but also those which could be encountered under the worst conditions of malfunctioning, accidents, or emergencies.

e. Test personnel will be able to use chemical agent detector kits, recognize symptoms of chemical agent poisoning in themselves and others, and use first aid and decontaminating procedures.

f. A record will be kept of any injuries suffered by test personnel during testing, regardless of how minor they may be and regardless of their relevance to testing.

6.1.4 Security

Security considerations will be provided for as applicable to each of the procedures described in this MTP.

6.1.5 Logistical Requirements

Prior to the conduct of any subtest, the test officer will ensure that all logistical requirements are satisfied.

6.1.6 Test Sequence and Sample Size

The procedures required in this MTP are divided into a series of subtests. The sequence may be modified by the test plan. The receipt inspection subtest must be performed first to ascertain the condition of test items as received from their manufacturer; the safety tests should be performed next to reveal any unforeseen hazards; the outdoor performance tests should be performed last. In preparing the test plan, consideration should be given to the number of test items available, their susceptibility to damage, time, availability of facilities, reliability and confidence limits set by QMR or SDR and budget limitations. Subtests deemed most likely to cause failure should be performed first so that the developing agency may have earliest possible notice of the deficiency.

6.2 TEST CONDUCT

6.2.1 Receipt Inspection

Subject the test item to the applicable procedures of MTP 8-2-500 following its arrival at the test site, with emphasis on the following:

a. Visually inspect the test item package and record the following:

- 1) Binding deficiencies such as broken straps, seals, etc.
- 2) Packaging material deficiencies such as cuts, tears, breaks, etc.
- 3) Rust and corrosion of metal containers
- 4) Illegible or missing markings
- 5) Deterioration of fiber cylinders, tape, etc.

- b. Unpack the test item and perform the following:
 - 1) Visually inspect the test item and record evidence of damage such as corrosion, dents, cracks, illegible markings, etc.
 - 2) Subject damaged items to the leak test procedures of paragraph 6.2.7.
- c. Determine and record the following:
 - 1) External dimensions and weight of the packaged test item
 - 2) All dimensions and weight of the test item
 - 3) Protective material such as:
 - a) Preservatives
 - b) Waterproofing
 - c) Other
- d. Serially number and identify each test item
- e. Photograph the damaged test items

6.2.2 Safety Evaluation

- a. Observe the installation and operation of the equipment in accordance with existing instructions, instruction manuals, directives, safety SOP's, and similar guidance. Record any hazardous conditions.
- b. Perform additional checks as required to verify all the safety aspects included in the Safety Statement prepared by the developing agency. Record deficiencies and recommended inclusions.
- c. Observe and record any information for inclusion in the Safety Release of reference 4A. (USATECOM Regulation 385-6).

6.2.3 Simulated Environmental Testing

6.2.3.1 Cyclic Storage

- a. Subject the test item in its packaging container to cycles of climatic extremes. A cycle shall consist of three weeks duration as follows: successive one-week tests at humid, low temperature, and high temperature. Chamber conditions for each climatic condition are as follows:
 - 1) Humid Storage. The chamber shall be maintained at $113^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and 85% R.H. for the duration of the test.
 - 2) Low Temperature Storage. The chamber shall be maintained at $-65^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for the duration of the test.
 - 3) High Temperature Storage. The chamber shall be maintained at $160^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for the duration of the test.
- b. The test item shall be subjected to a minimum of three such cycles, or more if required or specified. Upon completion of each cycle, the containers and contents shall be examined for damage.

6.2.3.2 Extreme-Temperature Tests

Unless directed otherwise by Combat Development Command, item will be subjected to the following temperature tests:

6.2.3.2.1 Low-Temperature Tests - Place a minimum of 3 test items in a test chamber, and perform the following:

a. Reduce the chamber temperature to -53.9°C (-65°F), maintain it at -53.9°C for a period of 72 hours, and then visually inspect the test items and record any damage.

b. Adjust the chamber temperature to the test item's minimum operating temperature as established by design requirements, and maintain this temperature until stabilization is reached. If stabilization is attained in less than 24 hours, maintain temperature for a complete 24-hour interval. Perform the following:

NOTE: Stabilization, unless otherwise specified, is considered to be reached when the temperature of the test item does not change more than 2°C (3.6°F) per hour.

- 1) Visually inspect the test items, and record damage.
- 2) Remove 1/3 of the test items, and verify operability as described in paragraph 6.2.8.

NOTE: Operability checks should be accomplished within 15 minutes of removing the test items from the chamber.

c. Remove the items from the chamber, allow their temperature to stabilize at local ambient conditions, and perform the following:

- 1) Visually inspect the test items, and record damage.
- 2) Subject 1/2 of the remaining test items to the leak test procedures of paragraph 6.2.7.
- 3) Verify the operability of the remaining test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.2.2 High-Temperature Tests - Place a minimum of 4 test items in a temperature chamber, and perform the following:

a. Adjust the temperature of the chamber to 68.3°C (155°F) and a relative humidity of 15 percent, maintain these conditions for a minimum of 4 hours, and then visually inspect the test items and record any damage.

b. Adjust the chamber to a temperature of 48.9°C (120°F) and a relative humidity of no more than 15 percent and maintain these conditions for a minimum of 24 hours. Then perform the following:

- 1) Visually inspect the test items, and record any damage
- 2) Remove 1/2 of the test items, and perform the following:
 - a) Subject 1/2 of the group of test items to the leak test procedures of paragraph 6.2.7.

- b) Verify the operability of the test item by subjecting the remainder of the group of test items to the procedures of paragraph 6.2.8.

c. Remove the remaining test items from the chamber, subject them to local ambient temperature and humidity for 24 hours, and perform the following:

- 1) Visually inspect the test items, and record any damage.
- 2) Subject 1/2 of the remaining items to the leak test procedures of paragraph 6.2.7.
- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.3 Fungus Test

a. Subject a minimum of 2 test items to the fungus test of Procedure I, Method 508, reference 4C (MIL-STD-810B).

b. At the completion of the cycling period, perform the following:

- 1) Visually inspect the test item and record signs of corrosion.
- 2) Disassemble 1/2 of the test items, and inspect the components for the presence of fungus.
- 3) Verify the operability of the items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.4 Humidity Test

a. Subject a minimum of 2 test items to the humidity cycling of Procedure I Method 507, reference 4C (MIL-STD-810B).

b. At the completion of the exposure period, perform the following:

- 1) Visually inspect the test items, and record any surface damage noted.
- 2) Disassemble 1/2 of the test items, and inspect the components for corrosion and deterioration.
- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.5 Dust Test

a. Subject a minimum of 2 test items to the exposure conditions of Procedure I, Method 510, reference 4C (MIL-STD-810B).

b. At the completion of the exposure period, perform the following:

- 1) Visually inspect the test items, and record any surface damage noted.
- 2) Disassemble 1/2 of the test items, and inspect the components for damage and presence of dust.
- 3) Verify the operability of the test items by subjecting the remaining number of test items to the procedures of paragraph 6.2.8.

6.2.3.6 Sunshine Test

a. Subject a minimum number of 2 test items to the sunshine conditions of Procedure I, Method 505, reference 4C (MIL-STD-810B).

b. At the completion of the exposure period, perform the following:

- 1) Visually inspect the test items, and record surface damage, such as deterioration of natural rubber and plastics.
- 2) Subject 1/2 of the test items to the leak test of paragraph 6.2.7.
- 3) Verify the operability of the test items by subjecting the remaining number of test items to the procedures of paragraph 6.2.8.

6.2.3.7 Water Immersion Tests

a. Subject a minimum of 2 cases of test items to the water immersion test of Procedure I, Method 512, reference 4C (MIL-STD-810B). If design requirements establish depth of water, water temperature, or time of immersion different from the standard procedure, the test plan will so state.

b. At the completion of the immersion test, remove the test items from their containers, and perform the following:

- 1) Disassemble 1/2 of the test items, and inspect their components for evidence of water penetration.
- 2) Subject the remaining test items to the operability test of paragraph 6.2.8.

c. If circumstances allow, repeat steps a and b with a minimum of 2 uncrated test items.

6.2.3.8 Salt Fog Test

a. Subject a minimum of 3 test items to the procedures of Procedure I, Method 509, reference 4C (MIL-STD-810B).

b. At the completion of the salt fog spray exposure, perform the following:

- 1) Rinse the test items with clear water.
- 2) Visually inspect the test items for the presence of corrosion.
- 3) Disassemble 1/3 of the test items, and inspect their components for evidence of water penetration and corrosion.
- 4) Subject 1/3 of the test items to the leakage test of paragraph 6.2.7.
- 5) Verify the operability of the test item by subjecting the remaining number of items to the procedures of paragraph 6.2.8.

6.2.3.9 Rain Test

a. Subject a minimum number of 2 test items to the rain conditions of Procedure I, Method 506, reference 4C (MIL-STD-810B).

b. At the completion of the rain exposure, perform the following:

- 1) Visually inspect the test items for the presence of corrosion.
- 2) Disassemble 1/2 of the test items, and inspect the components for evidence of water penetration and corrosion.
- 3) Verify the operability of the test item by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.4 Rough Handling and Surface Transport Tests

a. Subject a representative sample of test items, packaged in their original containers, to the following procedures of MTP 8-2-503:

- 1) The vibration test of paragraph 6.2.2.2a.3
- 2) The shock test of paragraph 6.2.2.1a.2

b. At the completion of testing, perform the following:

- 1) Examine the test item's packaging for cracks, breaks, undone binding, etc.
- 2) Examine the test items for damage and deformation.
- 3) Subject 1/2 of the test items to the leak test of paragraph 6.2.7.
- 4) Verify the operability of the test item by subjecting the remaining items to the procedures of paragraph 6.2.8.

6.2.5 Air Transportability

Determine the ease of loading and unloading from an aircraft as follows:

NOTE: Background information on air transportability is contained in (MTP 7-1-002).

a. Load the test items, in their shipping containers, aboard a typical cargo aircraft or simulated aircraft, using current standard loading equipment, and record the following:

- 1) Type of aircraft used or simulated
- 2) Shipping container length, width, height, weight, and material
- 3) Equipment used for loading
- 4) Difficulties encountered while loading
- 5) Method of tiedown
- 6) Damage sustained by the package during loading

b. Unload the test items from the aircraft or simulated aircraft, and record the following:

- 1) Equipment used in unloading
- 2) Difficulties encountered while unloading
- 3) Damage sustained by the shipping container during unloading

6.2.6 Airdrop Capability

Subject a minimum number of 2 test items, packaged in their original containers, to the applicable sections of MTP 7-2-509 as follows:

a. Rig the test containers, with attached accelerometers, to the appropriate airdrop containers, and drop the containers from a typical aircraft as directed by MTP 7-2-509. Record the following:

- 1) Aircraft type(s) used
- 2) Aircraft airspeed
- 3) Altitude
- 4) Meteorological conditions
- 5) Impact velocities
- 6) Deceleration magnitude at impact in g's

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- b. Cover the airdrop test procedures with still and motion cameras
- c. At completion of the test, perform the following:
 - 1) Examine the test item's packaging for breaks, undone bindings, etc.
 - 2) Examine the test items for damage and deformation.
 - 3) Subject 1/2 of the test items to the leakage test of paragraph 6.2.7.
 - 4) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.7 Leak Testing

a. Determine if the test item leaks as described in the applicable sections of MTP 8-2-512 after completing the following subtests:

- 1) Receipt inspection (paragraph 6.2.1)
- 2) Extreme-Temperature test (paragraph 6.2.3.2)
- 3) Sunshine test (paragraph 6.2.3.6)
- 4) Salt fog test (paragraph 6.2.3.8)
- 5) Rough handling and surface transport tests (paragraph 6.2.4)
- 6) Airdrop capability (paragraph 6.2.6)

b. When repairs are performed to prevent leakage, document the repairs and retest the item. Note effectiveness of the repairs.

6.2.8 Operational Reliability

NOTE: 1. Reliability tests will be conducted in accordance with current Army standard practices unless the test item has exceptional characteristics as noted in its QMR, SDR, TC, or other design requirement documents.

2. The test item undergoing operational reliability testing shall have previously been subjected to the following test procedures:

- a. Simulated Environmental Testing (paragraph 6.2.3).
- b. Rough Handling and Surface Transport Tests (paragraph 6.2.4).
- c. Airdrop Capability (paragraph 6.2.6).
- d. Decontamination Aspects (paragraph 6.2.9)

a. Select a suitable test site. The test site shall meet all safety requirements and be of sufficient size to ensure that the item under test is confined to the area of the test site. When this is verified record the following:

- 1) Type of soil under and around the transfer station.
- 2) Description of provisions used to ensure that mine overfill with spillage does not occur.
- 3) Description and nomenclature of the land mine being filled.
- 4) Description of the chemical fill agent being used.

5) Description of the chemical agent container, including:

- a) Nomenclature
- b) Method of installation
- c) Time required for set up
- d) Equipment required for set up

b. Connect the mine filling apparatus to the container and record the following:

- 1) Time required to assemble
- 2) Number of personnel required
- 3) Protective clothing worn
- 4) Preliminary preparation of connections
- 5) Difficulties encountered
- 6) Tools required

c. Assemble the pedestal or other supports for mines to be filled, and record the following:

- 1) Time required to assemble
- 2) Number of personnel required
- 3) Tools required
- 4) Difficulties encountered

d. Operate the apparatus according to the applicable instructions and record the following:

- 1) Number of personnel required
- 2) Time required to fill one mine
- 3) Lubrication required
- 4) Adjustment required
- 5) Any evidence of leakage or spillage
- 6) Difficulties encountered

e. Evaluate the unit's ability to measure and dispense the prescribed amount of fill without leakage or spillage.

f. Calculate the number of mines that can be filled in one hour.

g. Remove the apparatus and record the following:

- 1) Time required
- 2) Number of personnel required
- 3) Tools required
- 4) Difficulties encountered
- 5) Any evidence of leakage or spillage

h. Clean, decontaminate, and service the filling apparatus and record the following:

- 1) Procedures and materials used
- 2) Time required

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- 3) Number of personnel required
- 4) Difficulties encountered

6.2.9 Decontamination Aspects

a. Decontaminate the test item and evaluate the effects of decontamination on the test item as described in the applicable sections of MTP 8-2-510. Determine and record the following:

- 1) Decontaminants and methods which provide the most satisfactory results.
- 2) The effects of the most suitable decontaminant on the test items.
- 3) Safety precautions taken to protect personnel from decontaminant.
- 4) Difficulties in performing decontaminating operations at night.
- 5) Deviations that occurred in normal decontamination procedures.

b. Subject the test items to the operability test of paragraph 6.2.8 after decontamination.

6.2.10 Maintenance Characteristics

NOTE: Background information on checking a test item to determine its maintenance aspects is contained in reference 4B (USAMC Pamphlet 706-134).

a. Inspect the test item for deficiencies which will require replacement of components before the item can be tested. Photograph all deficiencies.

b. Complete authorized maintenance tasks in accordance with the test item maintenance manuals, instructions, etc.

c. Record the time and personnel required to perform scheduled and nonscheduled maintenance tasks throughout the period of testing.

d. Determine the accuracy of the maintenance manuals and evaluate the adequacy of the test item maintenance package.

e. Record whether special tools or skills are required.

f. Record the following:

- 1) Test item downtime (cumulative)
- 2) Time taken between repairs and reasons, if appropriate
- 3) Frequency of repairs
- 4) Nomenclature of repair parts used

g. Evaluate the test item design from the maintainability standpoint, as applicable.

6.2.11 Human Factors

Observe the human factors aspects of the test item throughout the conduct of all subtests required by the test plan. Specific aspects to be observed and recorded will include the following:

NOTE: Reference 4D (MIL-STD-1472) and reference 4E (MIL-H-46855) contain discussions of the human factors relevant to the items under test.

- a. Inconveniences encountered in handling and using the test item and any accompanying instructional materials.
- b. Compatibility with field clothing and equipment, particularly with protective clothing, arctic clothing, etc.
- c. Simplicity and adequacy of operating instructions.
- d. Conformance of the test item's design to qualitative requirements, particularly whether it is as compact and light as possible commensurate with functional characteristics.
- e. Legibility of identification markings.
- f. Ease of identifying items and components under daylight, darkness, and blackout conditions.
- g. Needs for special tools or special handling.

6.2.12 Agent-Hardware Compatibility

- a. Cross section the filling apparatus, and inspect its inner surface for corrosion, pitting, or any other evidence of damage caused by the chemical agent. Record any such evidence.
- b. Using photomicrographic techniques, compare the inner surface of a used filling apparatus with the same surfaces of an apparatus which has not been used. Record differences.
- c. If the specifications require it, determine the purity of the chemical agent which has passed through the filling apparatus, and compare with the initial purity of the chemical as required by the production specification.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the data collected as described in applicable sections of MTP 8-2-500 and the following:

- 1) For the test item package:
 - a) Binding deficiencies of packaging
 - b) Indication of damage and deterioration
 - c) Illegible or missing markings
 - d) Length, width, height in feet and inches
 - e) Evidence of rust or corrosion
 - f) Evidence of other deterioration, cracks, dents, etc.
 - g) Weight in pounds
- 2) For the test item:
 - a) Evidence of damage or deterioration.
 - b) Leakage data if required as described in procedures of paragraph 6.2.7.

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- c) Length, width, and height in feet and inches.
- d) Weight in pounds.
- e) Presence and condition of protective materials.

b. Retain all photographs of damaged items.

6.3.2 Safety Evaluation

Record the following:

- a. Any hazardous conditions
- b. Test item deficiencies and recommendations for improvement
- c. Information for inclusion in the Safety Release Recommendation

6.3.3 Simulated Environmental Testing

6.3.3.1 Cyclic Storage

Record the following for each cycle:

- a. Test item and identification number
- b. Cycle number
- c. Damage to:
 - 1) Container
 - 2) Test item

6.3.3.2 Extreme Temperature Tests

6.3.3.2.1 Low Temperature Tests -

Record the following for each test item if applicable:

- a. Test item identification number
- b. For temperature of -53.9°C (-65°F); damage incurred
- c. For minimum operating temperature:
 - 1) Temperature in °C and °F
 - 2) Test item damage incurred
 - 3) Operability data collected as described in paragraph 6.2.8
- d. For ambient temperature:
 - 1) Temperature in °C and °F
 - 2) Test item damage
 - 3) Leakage data collected as described in paragraph 6.2.7
 - 4) Operability data collected as described in paragraph 6.2.8

6.3.3.2.2 High Temperature -

Record the following for each test item:

- a. Test item identification number
- b. At temperature of 68.3°C (155°F) damage incurred
- c. At temperature of 48.9°C (120°F):
 - 1) Damage incurred
 - 2) Leakage data collected as described in paragraph 6.2.7
 - 3) Operability data collected as described in paragraph 6.2.8
- d. For ambient temperature:
 - 1) Temperature in °C and °F
 - 2) Relative humidity in %
 - 3) Damage incurred
 - 4) Leakage data collected as described in paragraph 6.2.7
 - 5) Operability data collected as described in paragraph 6.2.8

6.3.3.3 Fungus Test

Record the following for each item:

- a. Test item identification number
- b. Operability data collected as described in paragraph 6.2.8
- c. Evidence of corrosion on test item and components
- d. Evidence of fungus on test item and components

6.3.3.4 Humidity Test

Record the following for each item:

- a. Test item identification number
- b. Operability data collected as described in paragraph 6.2.8
- c. Evidence of corrosion on test item and components

6.3.3.5 Dust Test

Record the following for each test item:

- a. Test item identification number
- b. Operability data collected as described in paragraph 6.2.8
- c. Damage to:
 - 1) External surfaces
 - 2) Test item components
- d. Presence of dust on test item components

6.3.3.6 Sunshine Test

Record the following for each test item:

- a. Test item identification number

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- b. Surface damage
- c. Leakage data collected as described in paragraph 6.2.7
- d. Operability data collected as described in paragraph 6.2.8

6.3.3.7 Water Immersion Test

Record the following for each test item:

- a. Test item identification number
- b. During immersion:
 - 1) Presence of bubbling
 - 2) Immersion time to bubbling
- c. Indication of water penetration
- d. Operability data collected as described in paragraph 6.2.8

6.3.3.8 Salt Fog Test

Record the following for each test item:

- a. Test item identification number
- b. Operability data collected as described in paragraph 6.2.8
- c. Leakage data collected as described in paragraph 6.2.7
- d. Evidence of corrosion on test item and components
- e. Evidence of moisture penetration

6.3.3.9 Rain Test

Record the following for each test item:

- a. Test item identification number
- b. Presence of corrosion:
 - 1) Test item
 - 2) Test item components
- c. Evidence of water penetration

6.3.4 Rough Handling and Surface Transport Test

Record the following for each test item:

- a. Test item identification number
- b. Data collected as described in the applicable sections of MTP 8-2-503
- c. Leakage data collected as described in paragraph 6.2.7
- d. Operability data collected as described in paragraph 6.2.8

6.3.5 Air Transportability

Record the following:

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- a. Type of aircraft used or simulated
- b. Shipping container:
 - 1) Length, width, height in inches
 - 2) Weight in pounds
 - 3) Type of material
- c. Equipment used in loading
- d. Difficulties encountered while loading
- e. Method of tiedown
- f. Damages incurred while loading
- g. Equipment used in unloading
- h. Difficulties incurred in unloading
- i. Damage incurred to the package while unloading

6.3.6 Airdrop Capability

- a. Record the following for each test item:
 - 1) Test item identification number
 - 2) Type of aircraft used
 - 3) Aircraft altitude in feet
 - 4) Aircraft airspeed in mph
 - 5) Meteorological conditions, including:
 - a) Temperature in °C
 - b) Wind speed in mph
 - c) Wind direction
 - d) Relative humidity in percent
 - e) Barometric pressure
 - 7) Deceleration magnitude at impact in g's
 - 8) Impact velocity in fps
 - 9) For test item package:
 - a) Presence of cracks, breaks, etc.
 - b) Undone bindings
 - 10) For air test item:
 - a) Damage and deformation
 - b) Leakage data collected as described in paragraph 6.2.7
 - c) Operability data collected as described in paragraph 6.2.8
- b. Retain all motion and still pictures taken during test conduct

6.3.7 Leak Testing

Record the following:

- a. Test item identification number

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- b. Data collected as described in applicable sections of MTP 8-2-512
- c. Effectiveness of repairs to test item when applicable

6.3.8 Operational Reliability

Record the following:

- a. Soil type under and around transfer station.
- b. Provision used to prevent overfill or spillage.
- c. Nomenclature of land mine being filled.
- d. Chemical agent being used to fill mine.
- e. Meteorological data.
- f. For each chemical agent container:
 - 1) Description
 - 2) Method of installation
 - 3) Time required for set up
 - 4) Equipment required for set up
- g. For filling apparatus and pedestal or other support:
 - 1) Time required to assemble
 - 2) Number of personnel required
 - 3) Protective clothing worn
 - 4) Preliminary preparation of couplings
 - 5) Tools required
 - 6) Difficulties encountered
- h. Filling operation:
 - 1) Number of personnel required
 - 2) Time to fill one mine
 - 3) Lubrication required
 - 4) Adjustment required
 - 5) Evidence of leakage or spillage
 - 6) Difficulties encountered
- i. Measure the unit's ability to measure and dispense the prescribed amount of fill without leakage or spillage.
- j. The number of mines that can be filled in one hour.
- k. For disassembly of apparatus:
 - 1) Time required
 - 2) Number of personnel required
 - 3) Tools required
 - 4) Difficulties encountered
 - 5) Evidence of leakage or spillage
- l. Cleaning, decontaminating, and servicing:
 - 1) Procedure and materials used

- 2) Time required
- 3) Number of personnel required
- 4) Difficulties encountered

6.3.9 Decontamination Aspects

Record the following for each test item undergoing decontamination:

- a. Data collected as described in applicable portions of MTP 8-2-510.
- b. Decontaminants and methods which provide the most satisfactory results.
- c. The effects of the most suitable decontaminant on the test item.
- d. Safety precaution taken to protect personnel from decontaminant.
- e. Difficulties in performing decontamination operations at night.
- f. Operability data collected as described in the applicable procedures of paragraph 6.2.9.

6.3.10 Maintenance Characteristics

- a. Record the following:
 - 1) Adequacy of maintenance manuals
 - 2) Adequacy of the maintenance package
 - 3) Time required to perform, in minutes:
 - a) Scheduled maintenance
 - b) Unscheduled maintenance
 - 4) Personnel required:
 - a) Scheduled maintenance
 - b) Unscheduled maintenance
 - 5) Cumulative downtime in hours
 - 6) Time taken between repairs
 - 7) Frequency of repairs
 - 8) Nomenclature of parts used
 - 9) Special tools required
 - 10) Special skills required
- b. Retain all photographs

6.3.11 Human Factors

Record the following:

- a. Inconveniences encountered in handling and using the test item .
- b. Compatibility with field clothing and equipment.
- c. Adequacy of operating instructions.
- d. Conformance to qualitative requirements.
- e. Ease of identifying items and components under daylight, darkness

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and blackout conditions.

- f. Special tools required.
- g. Special handling required.

6.3.12 Agent Hardware Compatibility

- a. Record the presence of the following on the test item:
 - 1) Corrosion
 - 2) Pitting
 - 3) Rust
 - 4) Adverse effects caused by chemical agent
- b. Retain all photographs for the test file
- c. Retain all laboratory analysis for the test file

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Receipt Inspection

- a. Data collected as a result of this procedure shall be presented as indicated in the applicable portions of MTP 8-2-500.
- b. The description of the test item, number of items tested, and conditions upon receipt shall be presented in tabular form.
- c. Results of the leak subtest shall be presented in a narrative or other style of report.
- d. Photographs shall be used to substantiate results.

6.4.2 Safety Evaluation

- a. A Safety Release Recommendation (USATECOM Regulation 385-6) shall be forwarded to the U. S. Army Test and Evaluation Command within 30 days of the beginning of the test. Safety Release Recommendation shall contain the following information: special safety considerations or hazards to personnel and all types of material.
- b. Data and comments relative to the safety hazards observed during any phase of testing.
- c. Comments relative to suggested safety improvements.

6.4.3 Simulated Environmental Testing

- a. The results of the subtests conducted shall be presented in tabular or other suitable form.
- b. The results of the operational check tests performed at the conclusion of the various environmental tests shall be presented in narrative or other suitable form.

6.4.4 Rough Handling and Surface Transport

- a. Rough handling and surface transport data shall be presented as prescribed in MTP 8-2-503.

b. Vibration and shock data shall be presented in tabular form to indicate test times, distances (dropped), shock levels, vibration frequencies, etc., and significant findings of the test. Include photographs of damage.

c. Present data on operation of test item after subsection to rough handling and surface transport, conditions, vibration and shock.

6.4.5 Air Transportability

a. Data shall be presented in summary form as indicated in the applicable sections of MTP 7-1-002, and other test documentation.

b. Present data regarding any significant aspects of the test item observed during conduct of air transport testing.

6.4.6 Airdrop Capability

a. The results of the subtest shall be presented as prescribed in MTP 7-2-509 and include the following:

- 1) Type of aircraft
- 2) Airspeed, altitude, and meteorological conditions
- 3) Packaging material conditions after test
- 4) Maximum "G" force on opening of parachute and on impact

b. Present narrative comment and data regarding ease or difficulty encountered in accomplishing airdrop. Present photographs (as required) to indicate results of airdrop.

c. Present data on operation and performance of the test item after airdrop capability subtest.

6.4.7 Leak Testing

a. The results of leak testing shall be presented as prescribed in MTP 8-2-512.

b. Narrative comments, photos, etc., shall be included as required.

6.4.8 Operational Reliability

a. Data derived from this subtest shall be presented in narrative form supplemented by drawings, photographs, charts, tables, graphs, or any other suitable means of displaying information. Data evaluation shall specifically include but not be limited to the following:

- 1) Evaluate the ability of personnel and equipment to transfer a prescribed amount of chemical without leakage or spillage.
- 2) Evaluate the mean time it takes to fill a number of mines.
- 3) Evaluate the provisions of the equipment for handling toxic vapors.
- 4) Adequacy of existing decontamination methods.
- 5) Evaluate the minimum and maximum amount of personnel to adequately support the test procedure.
- 6) Calculate the mean time to assemble and disassemble the apparatus.

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- 7) Calculate the mean time taken to clean, decontaminate and service the equipment and make it ready for subsequent tests.

- b. The report shall clearly conclude whether the test item meets the reliability criteria established in applicable specifications. Recommendations relative to further testing and methods to overcome malfunctions shall also be included.

6.4.9 Decontamination Aspects

The results of this subtest shall be presented as indicated in the applicable sections of MTP 8-2-510.

6.4.10 Maintenance Aspects

The results of this subtest shall be presented in narrative form. The report shall be supplemented by photos, drawings, and other data to substantiate the conclusions and recommendations.

6.4.11 Human Factors

- a. Data from this subtest shall be presented in narrative, tabular or any other suitable form that is supplemented by photographs, drawings, and charts as required.

- b. A summary of comments regarding changes and recommended improvements shall be presented.

6.4.12 Agent/Hardware Compatibility

Data from this subtest shall be presented in a narrative form and shall clearly indicate whether the chemical agents have effect on the test item, its components, or other equipments. The report should be supplemented by photographs, drawings, or charts required to support the conclusions.

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